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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/591,145   | 08/30/2006  | Mitsunori Nakatani   | 1032404-000160      | 6140             |
| 21839  | 7590        | 12/24/2009           | EXAMINER            |                  |
| BUCHANAN, INGERSOLL & ROONEY PC<br>POST OFFICE BOX 1404<br>ALEXANDRIA, VA 22313-1404 |             |                      |                     | MERSHON, JAYNE L |
| ART UNIT   |             | PAPER NUMBER         |                     |                  |
| 1795   |             |                      |                     |                  |
| NOTIFICATION DATE  |             | DELIVERY MODE        |                     |                  |
| 12/24/2009   |             | ELECTRONIC           |                     |                  |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ADIPFDD@bipc.com

|                              |                        |                     |
|------------------------------|------------------------|---------------------|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |
|                              | 10/591,145             | NAKATANI ET AL.     |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |
|                              | Jayne Mershon          | 1795                |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 12 August 2009.

2a) This action is **FINAL**.                    2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 12-15 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 12-15 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All    b) Some \* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

|  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____ .                                    |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/16/2009</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application |
|  | 6) <input type="checkbox"/> Other: _____ .                        |

## **DETAILED ACTION**

### ***Status of Claims***

Claims 12-15 are pending. Claims 1-11 have been canceled. Claims 12-15 are examined below.

### ***Response to Amendment***

Applicant's amendment of 8/12/2009 does not render the application allowable.

### ***Status of the Rejections***

The previous rejection for claim 12 and therefore the rejections for all dependent claims have been withdrawn in view of applicant's amendment. Rejection of claim 15 has been maintained.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hikoharu (JP 6-143855 A) in view of Takeuchi et al. (US 2001/0039891).

Regarding claim 12, Hikoharu teaches a printing mask (see below figure) comprising: a first resin or emulsion layer (21) that is applied to the mesh (see paragraphs [0010] and [0014]); a second resin or emulsion layer (22) is formed directly on a surface of the first resin layer, wherein the thickness of the second resin layer is approximately 10  $\mu\text{m}$  (see paragraph [0014]); a pattern forming portion (i.e. opening 5, plus the area covered by first emulsion 11, but free of second emulsion 12) wherein the pattern forming portion is located in a region corresponding to a pattern to be formed on a printing object; wherein the pattern forming area is free of resin from the second resin layer. It is the examiner's position that the claim limitation stating "a pattern forming area in which the second resin layer is not formed" means a pattern forming area void of the resin or emulsion that makes up the second resin layer.

Further, Hikoharu teaches a mask portion in which the first resin layer and the second layer are formed, i.e. portion where both first emulsion (11) and second emulsion (12) are present (see paragraphs [0001] and [0010]-[0011]).

a peripheral portion of the printing area, but included in the printing area as defined previously within this claim, in which the first resin layer (11) is formed, but the second resin layer (12) is not formed, wherein the peripheral portion is located within the pattern forming portion and along a periphery of the pattern forming portion (see paragraphs [0001], [0007], and [0010]-[0011]).

The limitation that states the pattern is an "electrode pattern" is intended use and as such is only examined to the extent that the device as taught is capable of the intended use. Language that does not limit a claim to a particular structure does not limit the scope of a claim or claim limitation (see MPEP § 2106 II. C).

Hikoharu does not specifically teach a mask wherein the first emulsion layer is formed inside the mesh, nor does Hikoharu teach that the second emulsion layer is 3  $\mu\text{m}$  or less.

Hikoharu does teach the first emulsion layer is a gelatin photosensitive emulsion (see paragraph [0014]). It is the examiner's position that the emulsion being within the mesh is inherent to gelatin photosensitive emulsion as evidenced by Takeuchi et al.

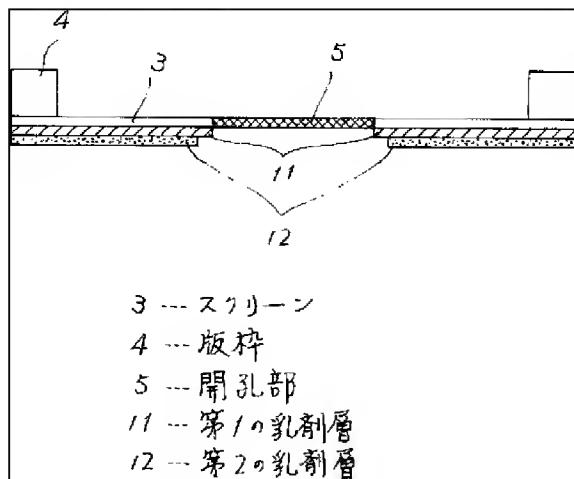
Takeuchi et al. does teach wherein an emulsion formed on a mesh, includes resin formed inside the mesh (see figs. 6A and 6B, paragraphs [0060]-[0061]). Takeuchi et al. states the resin is formed on the mesh, yet it is demonstrated in the figs. 6A and 6B that the emulsion is inside the mesh as well as on the mesh.

Regarding the thickness of the second emulsion, the total thickness of the printing is determined by the screen plus emulsion thickness (see Takeuchi et al. paragraphs [0062]-[0067]). Takeuchi et al. teach that screen thickness, web thickness, emulsion thickness, etc. depends on strength of the screen required, desired thickness of print, and number of screen passes in addition to other considerations (see paragraphs [0004]-[0011]).

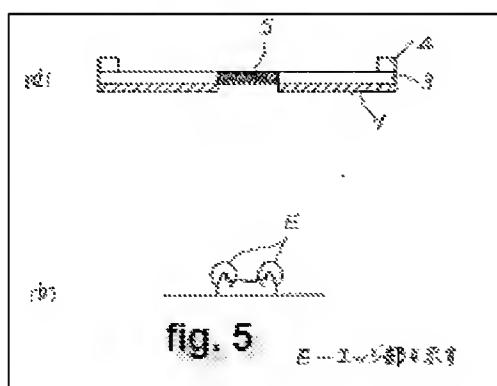
Hikoharu teaches the difference between the first emulsion layer and the second emulsion layer was optimized to reduce the edge buildup as a percentage in relation to the center portion of the pattern (see paragraph [0023] and Table 1). Therefore, the difference between first and second emulsion thicknesses will be dependent on the overall thickness of the mask, which is determined by the multiple considerations taught in Takeuchi et al.

The court has ruled that unless there is evidence to the contrary, then “where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). See also MPEP § 2144.05 II. A.

Therefore it would be obvious to a person having ordinary skill in the art to modify the second emulsion layer of Hikoharu to be 3  $\mu\text{m}$  because mask conditions for different patterns require different mask thicknesses and different mask thicknesses will require a person skilled in the art to modify the thickness of the second emulsion.



Regarding claim 13, Hikoharu teaches a printing mask wherein the peripheral portion (11) is located within a range corresponding to a width of a bulge from an end of the electrode pattern, which is formed at the end of the electrode pattern on forming the electrode pattern (see paragraphs [0006] and [0008]). Specifically, the edge portion is thicker as described (see fig. 5 below) and the problem is solved by the two layer emulsion. Note: see claim 12 regarding language “electrode pattern”.



Regarding claim 14, Hikoharu teaches a printing mask wherein the peripheral portion has a width of equal to or smaller than 0.2 millimeter, and is located within a range not less than 0.1

millimeter and not more than 0.5 millimeter from the periphery of the pattern forming portion (see paragraph [0010]). Specifically stated, the first emulsion (11) is smaller, for an example the first emulsion opening is specified as 4.8 mm by 1.8 mm and the second emulsion (12) forms an opening 5.0 mm by 2.0 mm (see paragraphs [0010]-[0011]). In the example given, the peripheral portion (11) is 0.2 mm smaller on each side, i.e. 5.0 mm (2<sup>nd</sup> emulsion) minus 4.8 mm (1<sup>st</sup> emulsion) = 0.2 mm, resulting in a 0.1 mm range on each side which meets the limitation of smaller than 0.2 mm. A specific example in the prior art which is within a claimed range anticipates the range (see MPEP § 2131.03 I).

2. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art in view of Hikoharu (JP 6-143855 A).

The instant application teaches as a general solar cell comprising:

- a semiconductor layer formed on a semiconductor substrate having a p-n junction in parallel with a substrate surface;
- a front silver electrode formed in a predetermined shape on a surface of the semiconductor layer;
- a back aluminum electrode formed on a back surface of the semiconductor layer so that a part of the semiconductor layer is exposed; and
- a back silver electrode formed to cover an exposed part that is not covered by the back aluminum electrode on the semiconductor layer and a part of the back aluminum electrode arranged adjacent to the exposed part (see paragraph [0007] of the instant application).

The instant application does not teach as prior art a solar cell wherein a difference in average film thickness between a bulge at an edge part and other parts of the back aluminum electrode is equal to or less than 5 micrometers.

Hikoharu teaches a method of reducing the difference in average film thickness between a bulge at an edge part and other parts of the part is 5 mm or less (see paragraph [0024] and Table 1), i.e. 0.4% of emulsion thickness 20 mm is less than 1 mm.

Although, Hikoharu does teach the reduction specified the actual reduction in the edge bulge is dependent on the thickness of the screen material and the thickness of the peripheral portion (11). Optimizing the peripheral portion to achieve a difference between the edge bulge and the center of the printed part is considered non-obvious (see MPEP § 2144.05 II).

Hikoharu teaches the two layer emulsion screen can improve the homogeneity of the printed film between the edge and center of the part being printed (see paragraph [0028]).

Therefore, it would be obvious to a person having ordinary skill in the art to modify the aluminum back electrode as taught in the instant application by printing with the screen taught by Hikoharu because the printed part would be more uniform and flat.

### ***Response to Arguments***

Applicant's arguments filed 8/12/2009 have been fully considered but they are not persuasive.

In regards to the arguments pertaining to the amendment of claim 12, see new grounds of rejection above.

In regards to applicant's arguments pertaining to the definition of in pattern forming area and outside of the pattern forming area, the applicant can give definition to the terms (see MPEP § 2111.01 IV). But, when examining the claim, the examiner looks to identify the structure.

Per the claim language, the pattern forming area is the area not encompassed by resin layer 2. It does not say, as implied in the argument, that any area under the screen is the pattern forming area and must be free of emulsion layer 1. In the rejection, the examiner addressed the claim language.

Regardless, the structure is 2 emulsion layers, one layer includes a mesh and emulsion layer, the second an emulsion layer with a slightly larger print opening than the first layer. Even if the claim language had limited the first emulsion layer to the thickness of the screen only as implied in applicant's argument, this would fall into the area of print thickness optimization.

### *Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jayne Mershon whose telephone number is (571) 270-7869. The examiner can normally be reached on 9:00 AM to 5:00 PM; alt. Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer Michener can be reached on (571) 272-1424. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JLM  
12/6/2009

/Jennifer K. Michener/  
Supervisory Patent Examiner, Art Unit 1795